

AMENDMENT FOR NEPA COVERAGE FOR
COUGAR LAKE
INTAKE STRUCTURE MODIFICATIONS
WILLAMETTE TEMPERATURE CONTROL
MCKENZIE SUBBASIN, OREGON

1. An Environmental Assessment (EA) was prepared for the Cougar Lake Intake Structure Modifications and released for public and agency review under Public Notice CENPW-EC-E-99-04 on July 15, 1999. A Finding of No Significant Impact was signed on November 30, 1999. This EA supplemented the Final Environmental Impact Statement on the Willamette Temperature Control Project, Cougar and Blue River Lakes, released in April 1995.

2. Project construction activities, i.e., drawdown of the reservoir through the newly opened diversion tunnel, resulted in more turbidity than had been anticipated and described in the FEIS and the 1999 EA. Corps regulations for implementing NEPA, ER200-2-2,13(d), provides for publishing additional supplemental information documents on long-term or complex Environmental Impact Statements (EISs) to keep the public informed. It was decided to prepare a supplemental information report (SIR) to address turbidity and to investigate whether the turbidity had caused significant impacts to the river environment. This amendment to the 1999 EA addresses effects of the unexpected turbidity from 2002, the management option to control turbidity during construction in 2003 and 2004, and new information.

3. Since the draft SIR and Environmental Assessment amendment were released for public review on January 30, 2003, two relevant events occurred. One was a storm event in late January, following several other winter storm events. Concurrent with the January 30 storm was a failure of the Rush Creek diversion outlet pipe. Following the initial elevated turbidity resulting from the failure, the pool was raised to 1,450 to cover the eroding slope below Rush Creek outlet. The slope failure caused an immediate spike in the turbidity downstream of the reservoir of 1,030 NTUs on January 30, 2003. The turbidity level dropped to 450 NTUs within 1 day and fell to 83 NTUs by February 3, 2003. While the slope failure caused an immediate spike, channel downcutting and migration by the South Fork McKenzie from January 30 to 31, 2003, resuspended a large amount of sediment contributing to the high turbidity observed downstream. (O'Brien, et al. 2003)

Once the situation stabilized, turbidity returned to 2 NTUs by March 3, with occasional short-term increases due to rain or slope slump elsewhere in the reservoir. Based on surveys of the failed slope, the failure area is confined to overburden and has not impacted the toe of the dam. The Corps will continue to operate at 1,450 and monitor the slope to assess if any repairs are required. At this point, no repair action is planned. The Corps will continue to monitor the situation.

4. Proposed Action. The proposed action is to continue the construction of intake structure modification at Cougar Dam, while operating the reservoir in a manner to minimize turbidity in the South Fork McKenzie and McKenzie Rivers during the spring fly-fishing season (April-May).

To reduce the intensity or duration of another high turbidity event during April such as occurred in 2002, the Corps investigated possible operational changes. The options considered included 1) increasing the drawdown rate below pool elevation 1,532 feet; 2) adjusting the winter flood control pool elevation; and 3) adjusting the target date to reach construction pool of 1,400 feet. Advantages and disadvantages of the options are described in the SIR.

The preferred alternative for operation of Cougar reservoir during the winter and spring of 2003 and 2004 was the low pool/6 feet/day drawdown option. The Corps would attempt, as much as possible, to maintain the pool at elevation 1,400 feet during the winter. When the pool exceeds 1,400 feet, then drawdown will be at the 6 feet/day rate. If the winter is wet, or if heavy rain occurs during the late winter/early spring, the pool elevation will be above 1,400 feet for short periods. Analysis and observation of conditions during the 3 feet/day drawdown has lead the Corps to consider a faster drawdown of up to 6 feet/day. The Corps geotechnical staff believes that a drawdown rate higher than 6 feet/day could cause excessive slumping of shoreline and possible damage to the dam.

The action for the remaining 2 years of construction is to maintain the pool at elevation 1,450 instead of 1,400. All other elements remain the same as proposed in the draft EA.

5. Affected Environment. The general affected environment is the same as that described in the previous EIS and EA. Some specific elements, such as recreation-related commerce and natural turbidity of the South Fork McKenzie and McKenzie Rivers, were not described. The presence of Oregon chub in the lower McKenzie River was discovered in 2000. DDT has been discovered in sediments exposed during reservoir drawdown.

Recreation-related Commerce. A description of recreation-related commerce, including river guides operating on the McKenzie River, was not included since impacts to this recreational industry was not identified. Several businesses, including river guides, lodges, retail stores selling fishing licenses and gear, food marts, service stations and restaurants are located along the McKenzie River and cater to recreationists throughout the year. While other river-oriented recreational activities occur throughout the year, fly-fishing is limited to the Spring season. For some businesses, particularly river guides, revenue from fly-fishing during March, April and May, constitutes a major portion of their annual income. A portion of other recreation-related businesses' income also derives from the fly-fishing season.

Turbidity. Natural turbidity in the South Fork McKenzie River can exceed 300 NTUs during winter and spring storms. Turbidity has been delayed and sediments diluted in Cougar Lake, thus that since the construction of Cougar Dam, turbidity in the lower South Fork and the McKenzie River has not been as high during the winter and spring months as pre-dam conditions. Turbidity recorded in January 1990 at Goodpasture Bridge exceeded 13 NTUs. Had Cougar/Blue reservoirs not been in place, the turbidity would have been much higher. Prior to the dam, high turbidity events would have cleared quickly from the McKenzie system. Over the last 40 years one of the impacts of the dam has been to dampen these high turbidity events. The dam causes turbidity downstream from these events to be lower and spread over a longer period.

Oregon chub. In the fall of 2000 a viable population of Oregon chub, listed as endangered under the Endangered Species Act, was discovered in the lower McKenzie River near Springfield, Oregon. In addition, a small population of Oregon chub was discovered in the Mohawk River, a

tributary of the McKenzie, known to contain agricultural runoff. A memorandum to the file documenting a no effect determination has been prepared. USFWS concurred.

DDT. In February 1996, 12 surface grab sediment samples were submitted for physical analysis and chemical analyses. These samples were collected, from within the reservoir, at the 1,400 feet contour near the intake structure and diversion tunnel and several upstream locations. No organic contaminants were detected above method detection levels (MDL). Although the 1996 sampling of reservoir sediments found no DDT, this pesticide was sprayed throughout the watershed (1949-1951) and still remains in surrounding forest duff and soil. DDT was banned in 1972. In 2002 eight water samples were taken between mid-May and mid-June during a range of turbidities. No contaminants were detected above established EPA concern levels (EPA, 1986) in any sample. A trace of DDT was detected in this sample at 0.000599 ug/L, which was also not confirmed in the duplicate sample. The lack of detection of these parameters in the duplicate sample lends credence to the view that, if the chemicals were in the sample, they were there in very low concentrations. This is below the EPA freshwater acute (1.1 ug/L) and chronic (0.001 ug/L) water quality criteria for DDT.

As a result of questions raised about potential contaminate levels in the turbidity and possible sediment releases, 12 surface sediment samples, targeting fine-grained sediment and organic material, were collected in June 2002. These samples were collected to target fine-grain and organic material that had been eroded during the drawdown, with one sample to represent lakebed sediments exposed after the drawdown event. All samples were submitted for physical parameters including total volatile solids and five samples were chemically analyzed for heavy metals (nine inorganic), total organic carbon, pesticides and polychlorinated biphenyls (PCBs), phenols, phthalates, miscellaneous extractables and polynuclear aromatic hydrocarbons (PAHs).

No PCBs were found at the Method Detection Limit (MDL) in any of the five June samples. No pesticides (except DDT and derivatives) were found at the MDL in any of the samples.

The following stations were tested for DDT and its breakdown components, DDE and DDD (expressed as Σ DDT) (with corresponding levels as indicated): two samples were collected from East Fork cut banks (Σ DDT @ 8.5 and 32.6 ppb), one sample below the Slide Creek boat ramp, from a cut bank area (Σ DDT @ 23.9 ppb), one sample from the Annie Creek delta (Σ DDT @ 18.6 ppb), and one sample was collected from lake deposits near the face of the dam on the Rush Creek side (Σ DDT @ 5.3 ppb).

Fifteen additional samples were collected in August 2002 and analyzed for physical properties, total organic carbon (TOC) and Σ DDT. Two background samples were collected from the South Fork of the McKenzie above the reservoir (no Σ DDT detected, less than 2.6 percent fines); three vertical profile samples from the cut-bank areas where only the fine-grained sediment was targeted in June (7.27, 7.11 and 17.65 parts per billion [ppb]); five surface composite sediment samples collected from the reservoir to represent the recently eroded and homogenized sediment during the drawdown event (non-detect [ND] @ 0.7 ppb detection level), 1.08, 4.77, 6.19 and 25.87 ppb). Each of these five samples analyzed were a composite of two to three surface grabs from a designated area of the reservoir; two surface samples from the McKenzie River, downstream of the dam (both ND @ less than 0.7 ppb) in slack water areas, where Σ DDT might have been deposited, if it had migrated beyond the confines of the reservoir. One upland station was sampled on a logging road cut bank. Samples represented the surface to 6-inch depth and 6-12 inch depth of forest floor debris (Σ DDT @ 374.6 ppb top 6 inches) and (Σ DDT @ 36.9 ppb 6-12 inch depth). (For more details see Appendix B of the SIR).

It is likely that some floating organic debris (fir needles, twigs, etc.), binding DDT, was released from the reservoir during the initial drawdown, but this material was likely distributed over a very large area, and not measurable nor posing any significant exposure to organisms, due to the wide distribution of this material. Because Σ DDT is hydrophobic (little affinity for water) it will tend to remain bound to the organic material and not be released to the water column. (See SIR, Appendix B.)

Aquatic Vegetation. There have been anecdotal reports of increased plant growth in the mainstem McKenzie since construction began at Cougar Dam in 2001. A combination of decreased light, increased turbidity, possibly increased nutrients such as phosphorus and organic carbon, and different water temperatures may have increased plant growth in the mainstem McKenzie. Or, the increased plant growth may have been a normal between years variation. Once construction of the modified intake tower is over, conditions should return to as before except for one environmental variable - temperature. Temperature in the South Fork is expected to return to pre-dam conditions.

6. Environmental Effects. The presence of turbidity and possible effects of turbidity, including sediment settling, in the South Fork and mainstem McKenzie Rivers were analyzed in regards to fish, spawning gravel and macroinvertebrates (insects). Effects of turbidity on esthetics, the Spring trout fishing season, and treatment of drinking water was also considered. No detectable DDT was found in sediment samples taken below Cougar Dam. A no effect determination has been made for Oregon chub.

Effects of Turbidity. The impact of turbidity on water quality was mainly related to esthetics. The turbid water below the project during April through May was unusual for this time of year, at least for the last 40 years since the project was built, and was esthetically displeasing. Contaminants analysis revealed that no water quality criteria were violated for any contaminant of concern, including metals, PAHs, organochlorinated pesticides, chlorinated herbicides, and organophosphorus pesticides. Oxygen, temperature, pH and conductivity levels were within normal limits. Particles in the water contributing to the turbidity were mostly clay-sized that remain in suspension for a long time. State turbidity standards were exceeded; however, this was expected to occur for the South Fork. Oregon Department of Environmental Quality (ODEQ) provided a list of reporting and management requirements should turbidity be visible in the mainstem McKenzie. The Corps has complied with the State's requirements.

Drawdown of Cougar Reservoir below its normal minimum pool level of 1,532 feet to the construction pool level of 1,400 feet resulted in substantial erosion of unvegetated soil surrounding the pool. The major tributary drainage streams flowing into the reservoir, the South Fork McKenzie, East Fork McKenzie, and Walker Creek, re-established channels to the lower pool at the 1,400 foot level. These processes transported large amounts of sediment into the newly created lower pool area at 1,400 feet. Detention time in the construction pool was sufficient to allow the bulk of the coarser grained sediment mass to settle out. Much of the fine-grained sediment mass (silt-clay fraction, grain size smaller than 62 microns) was released from the reservoir during the period from April 1 to May 25, 2002 when the pool level reached 1,400 feet. The fine grained material released from the reservoir caused extended elevated turbidity in the South Fork McKenzie to the confluence and into the mainstem McKenzie Rivers. Visual observation of the South Fork McKenzie River gravel bed below Cougar Reservoir and of the mainstem McKenzie River below its confluence with the South Fork indicated the presence of a thin layer of silty material following the sustained releases of highly turbid water from Cougar

Reservoir. This material did not accumulate on the surface of the gravel bed but was flushed through the system during subsequent high flows. In addition, some of the fine sediment in suspension accumulated in the algae covering the gravel bed, changing the color of the algae from green to gray.

In 2003, it was proposed that the reservoir elevation be held as close to 1,400 feet as possible, and that a reservoir drawdown rate of 6 feet per day be used to accomplish and maintain this. The impact of this operation on turbidity during late spring storm events will depend on pool elevation. If the pool is successfully maintained at elevation 1,400 feet, turbidity will be higher because there is less volume to dilute the suspended sediment, but the turbid water will clear more quickly because of a reduced retention time. If the lake elevation is higher, the turbidity may be less but clearing of the pool will take longer. The drawdown rate of 6 feet per day will help to clear the reservoir of turbid water faster than the slower drawdown rate of 3 feet per day did in 2002. Spring storms could still result in increased turbidity below the dam but the turbidity will be of shorter duration.

The Corps has maintained the residual pool at (or close to) 1,400 feet since May 2002 until January 30, 2003. A December rainstorm increased incoming flows and turbidity, resulting in the pool rising to 1,411 feet, and releases of turbidity up to 200 NTUs on December 30. Incoming turbidity in the South Fork reached 24 NTUs late on the 29th of December, thus the downstream turbidity was a about 10-fold increase, as originally predicted. Turbidity at Hayden Bridge rose to 24 NTUs during that storm. (Average for December was 3.72 NTUs at Hayden Bridge.) (EWEB, pers. comm. Jan. 2003) The Corps was able to draw the reservoir back to 1,400 feet by January 1, 2003. Another rain event elevated the pool to 1,413 on January 5; however turbidity remained below 120 NTUs and dropped below 10 NTUs by January 8. Turbidity in January has not exceeded 120 NTUs, and generally has been between 55 NTUs and 3 NTUs (as of January 22, 2003).

Holding the reservoir at 1,400 feet during the winter did help regulate the turbidity until the January 30 storm when the Rush Creek outlet failed. Incoming turbidity in the South Fork during this January storm was about 78 NTUs. With the Rush Creek outlet failure, turbidity briefly (a one-half hour reading) exceeded 1,000 NTUs below the dam, and reached 100 NTUs on the mainstem McKenzie at Vida for a similar time period. As noted above, this cleared by early March. Turbidity during the March-April fly fishing season was, for the most part, near normal. In the March to May time period, incoming turbidity ranged from 30 to 0 NTUs; turbidity below the dam varied mostly between 25 and 2 NTUs, with one spike of 55 NTUs. Turbidity at Vida stayed between 15 and 1 NTUs with one spike of about 50 NTUs corresponding with the spike below the dam. Thus, managing the reservoir at elevation 1,450 during this period kept turbidity in the mainstem McKenzie within successful fishable limits. And, although the river was high, good insect hatches were reported (*The Register-Guard*, April 3, 2003). In addition, the coffer dam was not breached, and construction continued all winter and spring seasons, keeping the project on schedule. The Corps expects that turbidity in the Spring of 2004 will be greatly reduced from the 2002 levels.

DDT in Sediment. Total DDT was exposed in cutbank areas within the reservoir, which eroded into the post-drawdown 1,400 foot pool, but was not measurable downstream of the dam. Total DDT levels detected within the 1,400 foot pool were 4.8, 6.2, 1.1, ND @ less than 0.6, and 25.9 ug/kg (ppb). Further erosion will occur within the pool, but will likely be less than the original drawdown event and will therefore not create further risk downstream. The sediments within the

reservoir will be further redistributed with upcoming winter and spring events. Monitoring after the final deposition and distribution within the reservoir would be warranted to determine if natural attenuation will sufficiently isolate the Σ DDT from potential uptake by benthic organisms.

Four of five sediment samples collected within the reservoir did not detect Σ DDT above levels of concern. Sediment will continue to be deposited onto the reservoir bottom. The current area, within the reservoir, where Σ DDT exceeds reference levels of concern, is limited and will likely change with future deposits. This area should be continually monitored, as should the area below the dam.

No Σ DDT, at MDLs, was detected in sediment samples collected below Cougar Reservoir. A no effect determination has been made for this area.

Spawning Gravel. Results of core samples taken of the spawning gravels in the South Fork McKenzie River below Cougar Reservoir and in the mainstem McKenzie River showed higher accumulation of fine sediments in the samples in the South Fork McKenzie than was present in the samples from the mainstem McKenzie River. Further analysis of the mainstem McKenzie River samples did not find clear evidence of Cougar Reservoir sediments based on the clay mineralogy (Stewart et al., 2002). These results suggest that relatively little of the sediment discharge from Cougar Reservoir settled in any one location in the mainstem McKenzie, though as discussed above, a fine dusting of deposited material was evidenced. The analysis by Stewart et al. (2002) also cannot ascertain when sediments were deposited below Cougar Dam. They may have accumulated over the 40 year time period in which the reservoir has been in place.

While accumulation of fine sediment has occurred below Cougar Dam over an unknown time period, the high turbidity events during Spring 2002 were unlikely to have had long-term negative impacts on spawning gravel quality below Cougar Dam. However, assessment of the rate of fine sediment accumulation in gravel areas during future storm events over the winter of 2002-2003 was planned to aid in better understanding the dynamics of fine sediment transport and deposition, and its effects on habitat. Because of so few winter storms in 2003 and because of late receipt of FY 03 appropriation, the sediment trap studies could not be conducted this year. They are still under consideration for 2004, subject to the availability of funding.

Macroinvertebrates. The abundance of organisms, species diversity, and presence of species sensitive to high levels of turbidity that were found in aquatic macroinvertebrate samples collected from areas located downstream of Cougar Dam indicated that this area was not heavily impacted by the relatively high turbidity events of spring 2002. Analysis indicated that the macroinvertebrate community below the dam was degraded in comparison to the community located above the reservoir. However, this is not unusual for areas located below dams, and this trend was also indicated in samples collected during 2000 and 2001 prior to drawdown of Cougar Reservoir (SIR, Figure 5). Indexes of biotic and habitat integrity (Wisseman 1996) ranged from moderate to low integrity for sampling stations located downstream of Cougar Dam. It was reported in the *Eugene Register-Guard* (April 3, 2003) that there were “good insect hatches” in the McKenzie River, which would support the Corps’ analysis.

Fisheries. The high turbidity events of spring 2002 had only minor, transient, impacts on fishes directly and relatively little effect on their habitat. Application of a scoring system developed by Newcombe and Jensen (1996) for relating magnitude (i.e., concentrations) and duration of

suspended sediment events to effects on salmonids resulted in scores (z) ranging from 6 to 8 for levels of turbidity occurring directly below Cougar Dam. These scores indicate that impacts to salmonids in the South Fork McKenzie River resulting from the high turbidity events of spring 2002 may have ranged from moderate physiological stress ($z=6$) to reduction in feeding rate ($z=8$) during the period of high turbidities. No mortalities, however, ($z\geq 10$) were indicated.

Assessments of condition for multiple fish species sampled both from below Cougar Dam and from within the residual pool above the dam by ODFW biologists and pathologists failed to detect health-related problems and documented that most fishes sampled were actively feeding and in good condition.

Aquatic Vegetation. For the past 39 years, since the dam was built, the South Fork and the mainstem McKenzie Rivers, probably as far as Vida, have not been "natural" in terms of historic conditions that fish and humans residents experienced. The river, as now experienced, is not the normal, natural, pristine river. The purpose of the construction project is to return the South Fork and mainstem to more natural conditions. The aquatic organisms that now inhabit the rivers are adapted to pre-modified intake tower conditions. Some changes in aquatic communities that reflect the restored natural conditions can be expected. Aquatic flora will adapt to the more normal conditions, with some species becoming more dominant than others.

Socio/Economic. The 2002 Cougar drawdown had a negative effect on trout fly-fishing on the McKenzie River that was not anticipated or evaluated in the FR/EIS. On April 1, the Corps started drawing down Cougar Reservoir in order to install a multi-level intake tower, which would release water into the river at temperatures appropriate for threatened species of fish. That sent accumulations of clay into the river and turned it a brownish-gray color. This caused turbidity levels to spike more than anticipated. Then, on May 26, the Corps stopped drawing down the reservoir. According to the *Springfield News*, by June 12 the turbidity had dropped back to normal levels.. The *Springfield News* also noted that one of the fishing guides reported staying away from the river from April 14 until June 5. The guide indicated that while the McKenzie was not back to its typical clarity by that time, the fishing was good and the river was getting near record runs of steelhead and salmon.

The turbidity problem affected fishing guides, lodges, motels, gas stations, restaurants, and small grocery stores, according to the Convention and Visitors Association of Lane County (CVALCO). CVALCO, the McKenzie River Chamber of Commerce, and the river guides association mailed out a survey to lodge owners and other local business owners. It was called "Cougar Reservoir Draw-Down Economic Impact Survey" and included questions about type of business, comparative gross revenues from 1999 to 2002 (or, change in gross revenues), customer counts (1999 to 2002), and cancellations or other declines in business attributable to turbidity of the McKenzie River or other Cougar Reservoir draw-down-related factors.

A news release from the McKenzie River Chamber of Commerce and the Convention and Visitors Association of Lane County summarized the results of the survey, as follows. "During March, April and May, area businesses reported 301 cancellations, resulting in lost revenues of \$88,656. Most of the losses were reported by river guides, with \$15,000 to \$16,000 of lost revenue reported by lodging, retail and other business owners. Customer counts dropped by 445, from 1,723. Guide-related revenues were down \$48,712 compared to the same time last year. Other survey respondents noted that poor river conditions resulted in a lower call volume with

fewer bookings. A total of 27 businesses responded to the survey reflecting only a partial sampling of the overall impacts.”

The survey is in no way used as a projection. Neither is it a claim to have captured total area economic losses. As CVALCO noted in their press release, “A total of 27 businesses responded to the survey reflecting only a partial sampling of the overall impacts.” In a February 14, 2003, comment letter on the draft Supplemental Information Report, CVALCO also noted that “Reporting was not uniform (some surveys were partially blank). Some responses lacked financial data and indicated only that they were having to abandon their business, or included estimates of lost customers but not related financial impacts. CVALCO was very careful to stipulate in its release of data that results were based on a small response and not representative of total economic losses.”

These comments regarding the survey reveal some of the inherent difficulties found in gathering specific information on economic or financial impacts, whether using various survey instruments or direct contacts. Not everyone is willing to provide such information. The survey simply presents a summary of the information provided by the 27 businesses who did respond to the survey.

To help put economic impacts in a local context, some illustrations of claimed losses from a June 7, 2002, letter from the attorney for the President, McKenzie River Guides Association are included here.

“1. Income for some of the resorts is down for the March to May months is down \$10,000 to \$20,000.

2. McKenzie River Guides Association members have had clients cancel over one hundred fishing days with clients.

3. A Walterville store which usually sells 200 fishing licenses by the end of May, as well as selling associated bait, tackle and other fishing supplies, has only sold about ten licenses to date.

These examples indicate that the recent, prolonged sediment pollution on the mainstem of the McKenzie has led to socio-economic impacts unforeseen in the original EIS or the Supplemental EA.”

Locals indicate that these impacts have been difficult, particularly for smaller businesses that are very dependent on the summer tourism season. Some of the businesses operate near capacity for a relatively short season, and don’t have the capacity to make up for early losses later in the season. There is local concern that if the same impact recurs over the next few years, there will be more lasting damage to the local tourism economy.

Congressman DeFazio has sponsored legislation for some compensation for losses in the Water Resources Development Act legislation. If that occurs, the incentive of compensation may result in more than 27 respondents submitting claims of economic impact, thereby increasing the \$88,656 figure for lost revenues.

EWEB. Eugene Water and Electric Board manages the municipal water supply for Eugene. The intake for the water supply plant withdraws from the McKenzie River near Hayden Bridge, 49

miles downstream from Cougar Dam. EWEB tested for several water quality parameters related to construction at Cougar Project. During the drawdown, turbidity fluctuated between 2 and 26 NTUs. The average turbidity recorded at Hayden Bridge during the 2 month period (April and May 2002) was 10.3 NTUs compared to 2.6 NTUs for the same time period in 2001. Based on treatment plant criteria, additional chlorine was used when the river water exceeded 3.0 NTUs. The additional turbidity needed a slightly higher alum dosage (about 2 mg/l), additional lime for pH adjustment and substantially more backwash water (with corollary return to the river) during the drawdown. Subsequent to the drawdown period, EWEB tested sludge for presence of DDT and found neither DDT nor any breakdown products. EWEB did have concerns that, should turbidity exceed 3.0 NTUs during high demand summer months, they would not have the capacity to do extra filtration to meet that demand. Additional chemical usage and filtration, an increase in power and staffing was required during the Spring. These additional treatments added extra costs to the usual treatment costs. The Corps agreed to hold Blue River Reservoir full and release additional flow late in the summer season to dilute turbidity in the McKenzie. This action was not necessary in 2002.

7. Compliance with Clean Water Act. The ODEQ reviewed both the 1995 EIS and the 1999 EA/Section 404 Evaluations. ODEQ's comments in 1999 were that the potential of the project to produce long-term, identifiable benefits to the fisheries resource through temperature modification appeared to outweigh any short-term effects of turbidity. Should turbidity during construction be visible in the McKenzie River, the reason must be determined and BMPs implemented to solve the problem and minimize the impacts. A log of storm events and river conditions should be maintained and problem events reported to ODEQ. These requirements have been followed by the Corps.

Turbidity refers to water clarity. It is measured in Nephelometric Turbidity Units (NTUs), which indicate how light passes through (or reflects on) suspended sediment in the water column. State standards for turbidity (OAR 340-041-0445(2)(c)) are no more than a 10 percent cumulative increase in natural stream turbidities as measured relative to a control point immediately upstream of the turbidity causing disturbance. However, limited duration activities necessary to accommodate essential dredging, construction or other legitimate activities may be authorized provided all practicable turbidity control techniques have been applied and permit or certification authorized under terms of Section 401 or 404 of the Clean Water Act.

ODEQ is a participating member of the Environmental Coordinating Committee. As such, ODEQ has been advised of all water quality situations that developed during construction of the WTC facilities at Cougar Dam. This coordination will continue during the remaining construction, and post-construction monitoring.

8. Endangered Species Act. The biological assessment previously prepared is being amended to include the Oregon chub, found in 2000 to inhabit the McKenzie River near Springfield. The Corps has made a determination of no effect. The Rush Creek northern spotted owl pair nested in 2003 and fledged two young. No adverse affects on this pair were noted.

9. Evaluation/Mitigation. The situation regarding turbidity and sediment has been evaluated as described above. While turbidity during the 2002 drawdown exceeded predictions in the mainstem McKenzie River, levels were not unusual for historic late winter-early spring flood events. The drawdown did occur later in the Spring than predicted, making turbidity more noticeable and interfering with the trout fly-fishing season. The Corps stopped the drawdown at

1,400 feet elevation, instead of continuing to lower the pool to 1,375 as originally proposed, and the water cleared to less than 15 NTUs by June 15.

This situation can be mitigated during the remaining 2 years of construction by operating the reservoir at 1,450 foot elevation year-round to the extent possible. Levels exceeding 1,450 feet will be drawn down at the rate of 6 feet/day instead of the previous 3 feet/day. This should allow the reservoir to be at 1,450 feet by March 1, and returned to 1,450 feet more quickly if there is a major Spring storm. Turbidity measurements during November through January indicate that the present management of the residual pool is meeting expectations of lower turbidity. Turbidity will continue to be monitored during construction years.

DDT was not detected in sediments below Cougar Reservoir. Monitoring will continue during construction years.

Deposition of fines and insect occurrence were evaluated during the summer/fall of 2002. While accumulation of fine sediment has occurred below Cougar Dam over an unknown time period, the high turbidity events during Spring 2002 were unlikely to have had long-term negative impacts on spawning gravel quality below Cougar Dam. Analysis indicated that the macroinvertebrate community below the dam was degraded in comparison to the community located above the reservoir. However, this is not unusual for areas located below dams, and this trend was also indicated in samples collected during 2000 and 2001 prior to drawdown of Cougar Reservoir

Income losses in 2002 due to reduction of trout fly-fishing and associated expenditures were evaluated by the Convention and Visitors Association of Lane County (CVALCO). Legislative action may provide some mitigation for these losses.

Actions by EWEB due to turbidity in municipal water supply intake have been described. Additional filtering was required during the Spring, but not during Summer months. Water is available from Blue River Reservoir to dilute turbidity in summer months should this become a problem.

10. Significance. Effects of turbidity in the South Fork of the McKenzie and the McKenzie mainstem during construction drawdown of 2002 were primarily local and esthetic. There are no indications that fish or aquatic invertebrates were adversely affected. Fishing later in the season was quite good (Stahlberg, 2002.) Fall spawning in the South Fork noticeably increased in 2002 due to river water approaching pre-dam levels, a strong indicator that the purpose of the temperature control project will be achieved. Total spring chinook redds below Cougar Dam increased from 61 in 2001 to 108 in 2002. This increase occurred below USFS Road 19, about 2.4 miles below the dam; above the bridge there was a decrease in redds from 44 in 2001 to 24 in 2002. This was a good year for spring chinook, thus all of the increase is not necessarily due to the restoration of normal stream temperatures (ODFW, pers. comm. 2003).

There was an unexpected financial impact on the local economy. Interference with spring trout fly-fishing was not anticipated. According to CVALCO, local residents and businesses reported losses totaling about \$88,656. While this may have caused temporary hardship for local residents, it is not regionally or nationally significant, given that the 2002 Oregon Employment Department Regional Economic Profile indicates that the Eugene MSA (Lane County) had a 2000 population of 323,950 people, with a per capita income of \$25,584, resulting in total

income of approximately \$8.3 billion dollars in the regional area. Springfield is the nearest city for which the Oregon Employment Department 2002 Regional Economic Profile provides statistics on population. It had a 2000 population of 52,864. (Neither the Oregon Employment Department or the Portland State University Population Research Center provide information on smaller communities such as Walterville, Leaburg, Vida, Blue River, and McKenzie Bridge.) The U.S. Census Bureau, Census 2000, shows 1999 per capita income of \$15,616. Using the local Springfield population of 52,864 people, with a 1999 per capita income of \$15,616, results in a total income of approximately \$825.5 million in the Springfield area. Recognizing that the losses actually reported may not capture the total economic losses that resulted from the Cougar drawdown, even a substantial increase in losses would not be regionally significant, or in the more local context of Springfield. It is recognized that there were unanticipated disruptions to individuals in local communities, and those affected have concerns about economic impacts to their businesses. Recompense is a possibility via legislative action. The local and regional economy also benefited from construction related expenditures, although no estimate of that benefit is available. With changes in operation of Cougar Reservoir during the remaining construction years, interference with trout fly-fishing season and subsequent economic loss is not expected to re-occur or be as pronounced as in 2002. Heavy spring storms, however, could still result in turbid conditions. In fact, a winter storm resulted in high turbidity and flows. By holding the pool at 1,450 feet, turbidity below Cougar was back to 6 NTUs by the March trout season. While low NTUs during the entire fishing season cannot be assured, the Corps has taken and will continue to take all available measures and practices to reduce disruption during the 2 remaining years of construction.

11. Coordination

The draft EA amendment and SIR were issued for 30-day agency and public review on January 30, 2003. Both EA amendment and SIR were made available on the internet. A public notice and draft EA were mailed. Comments were requested from numerous agency and interested organizations and publics, including:

A public meeting was held in Walterville, Oregon, on February 12. In addition to news releases, a reminder of the meeting was sent to interested publics by Congressman Peter DeFazio's office. About 80 people attended the meeting. Comments from the meeting were summarized and responded to in a posting on the Corps' internet site for the project. The Corps received six written comments on the EA/SIR as a result of the meeting, mailing and internet posting. Comments were received from the National Marine Fisheries Service (NMFS), the McKenzie Watershed Council Water Quality Monitoring Committee (MWWQC), Eugene Water and Electric Board (EWEB), William C. Carpenter Jr., Kari Westlund (CVALCO), and David Rodriguez.

The NMFS provided limited, e-mail comments on pre-construction water quality. Comment: The designation of the South Fork McKenzie water as "excellent" is questioned because the recommended maximum for salmonid spawning is 55 degrees F. Response: Temperatures do reach 60 degrees F during summer. However, under current drawdown conditions, the problems regarding reluctance of spawners to enter the South Fork during summer and regarding warmer than normal water temperatures during overwinter incubation have been ameliorated to some degree, if not to a substantial degree. So, water quality has been improved already with respect to these parameters. As noted, the purpose of the WTC project is to restore river temperatures to pre-dam conditions.

The MWWQC acknowledged that many individual Partner organizations within the Council support the WTCP. Comment: The Corps needs more discussion on adaptive management scenarios and “emergencies” like the high water period in January 2003. Response: The Corps will continue to discuss adaptive management in the context of the ECC. The high water period in January did not constitute an emergency. Comment: The Corps should identify and analyze potential measures to decrease turbidity. Response: The reservoir operational plan presented in the Draft SIR contains measures to reduce turbidity downstream of Cougar. The target pool elevation maintained during the non-construction season and increase in rate of evacuation serve to reduce turbid discharge as much as possible. Structural measures inside the reservoir on a practical scale would be ineffective during high inflows. Comment: There is no discussion of the development of the sediment concentration/turbidity coefficient (p. 29 of the draft SIR). Response: Discussion of estimated sediment loads as related to turbidity is presented in Appendix D of the SIR. Comment: There is conflicting information in Section 7.5 about sediment deposition into the river. Response: Section 7.5 has been clarified. While sediment core analysis of both the South Fork and mainstem McKenzie indicated that fine particles were located in the South Fork, some very fine particles remained in suspension for greater distances. Some of these very fine particles probably settled out in the mainstem on the gravel surface, but were not found in the cores; some likely traveled all the way to the ocean. Comment: The following techniques to protect water quality were not addressed: bed/bank scour control on reservoir inflow, such as bank armoring; establishment of vegetation above the 1,450 foot level to counter wave-driven erosion. Response: Bank protection in certain areas would possibly result in more erosion downstream and further degrade water quality. Re-vegetation of the reservoir has occurred above the 1,450 foot level in some areas naturally. Comment: (Appendix A, SIR) Leaburg Lake should be evaluated as a potential sediment sink. Response: It is likely that some sediment deposition has occurred over time in Leaburg Lake. We did not evaluate Leaburg Lake as a sediment trap as part the SIR because our analysis of sediment transport out of Cougar did not indicate that a high degree of sedimentation would have occurred in Leaburg Lake due to construction activities at Cougar. The bulk of the sediment discharge from Cougar was made up of very fine grained material which would require a long residence time to settle out in Leaburg Lake. Sediments within Leaburg Lake would likely be derived from a number of sources, including the mainstem McKenzie and Blue River, as well as the South Fork (Cougar Reservoir). All of the forested areas in the area had DDT applied between 1949 and 1953 for budworm control (ref. U.S. Forest Service Map 31). We felt collecting suspended sediment during storm events would better represent what might be migrating out of Cougar Reservoir. Comment: The type and location of pesticide monitoring is not specified in the SIR, nor is mitigation, other than sediment minimization, proposed. Could the Corps use the technique of using “lower” life forms to assess the tropic accumulation of DDT? Response: DDT does bioaccumulation and the Dredge Material Evaluation Framework has established protocol for conducting bioaccumulation testing. A bioaccumulation “trigger” or level at which bioaccumulation testing should be conducted, has been established at 50 ug/kg. All samples collected within the reservoir were well below the trigger level. No DDT has been detected below the reservoir. Comment: Additional sampling for DDT is strongly encouraged. Response: Additional sampling for DDT has been conducted on suspended sediment (SS) below the reservoir during two storm events. There are plans to continue DDT testing on SS during future storm events. No DDT has been detected below the reservoir. Comment: A more serious consideration of downstream aquatic vegetation is encouraged. Response: See new section on Aquatic Vegetation added to the final documents.

EWEB. EWEB reiterates their overall support for the WTCP. Comment: Consider the events of January 2003. Response: These events have been considered and described in the final SIR/EA amendment. The Corps has maintained the pool at the target elevation of 1,450 since the Rush Creek outlet failed. Comment: Maintain the pool at 1,450'. The larger pool will keep additional sediments under water and provide additional buffering for future turbidity events. Response: Concur. The pool is being maintained at this level until the bank is stabilized, as needed. A permanent change in operation, which would maintain the pool at 1,450 feet for the remainder of the construction period, is an option. If the pool is maintained at this higher elevation the following could occur:

- An increased risk of flooding the construction site by overtopping the cofferdam at 1,495 feet during the construction season (13.7 percent vs. 7.8 percent).
- An increase in the relative time it takes to clear the reservoir of turbid water caused by erosion occurring within the reservoir. The volume of water the reservoir holds at 1,450 feet is approximately three times greater than at 1,400 feet. It would take longer to clear the reservoir of the turbid water, extending the duration of the turbidity downstream.

The effects on erosion and sedimentation processes within the reservoir by operation of the pool at the 1,450 foot level versus 1,400 feet are:

- A likely decrease in slope failures in the lower pool. Several localized slope failures were observed after the late January storm. Changes in pool elevation would be smaller for a 1,450 foot pool given the higher storage capacity above 1,450 feet.
- More of the exposed fine sediment deposits are covered at a 1,450 foot level, thereby exposing less material to resuspension and transport downstream.

Comment: The EPA chronic water quality criteria for DDT is 0.001 ug/l. Response: Corrected.

Comment: While it is true that DDT is hydrophobic and has little affinity for water, DDE is more water soluble and more likely to be found in the water column than DDT. Response: It is true that DDE is slightly more soluble than DDT, but is still very low, < 0.1mg/l. Monitoring is planned for total DDT (DDT + DDE + DDD). Solubilities are:

pp' DDT = 0.0077 mg/l @ 20°C

pp' DDE = 0.065 mg/l @ 24°C

pp' DDD = 0.05 mg/l @ 25°C

Comment: EWEB does not provide municipal water for Springfield. Response: Corrected.

Comment: The effects on EWEB's operations included additional chemical usage and filtration, an increase in power and staffing requirements, and an increase in costs. Response: Effects have been added. (SIR)

Comment: The information in Section 4.6.3 is somewhat misleading. There are no ambient water quality criteria nor is there an MCL for diazinon. The detection of malathion at 0.155 ug/l exceeds the EPA ambient water quality chronic criteria of 0.1 ug/l. EPA freshwater acute chronic standard for DDT is misreported as 0.0001 ug/L. Response: It was not stated that there was a water quality criterion for diazinon. What was stated was that "no contaminants were detected above **established** EPA concern levels" Although malathion was detected at 0.155 ug/L in one sample, none was detected in the duplicate. That was the basis for stating that no chemicals were found above concern levels – including malathion. Wording in Section 4.6.3 has been clarified and the DDT criteria reported correctly. Comment: Section 7.1 Turbidity. Turbidity during April and May 2002 increased EWEB's cost to process water.

Response: Increased costs have been acknowledged in the Economics Section and other relevant sections. Comment: Section 7.3. DDE is more soluble than DDT. It is important to continue to look for DDE below the dam. Response: See response above regarding DDE. Comment:

Appendix A—additional monitoring for pesticides, especially at Leaburg Lake, is needed.

Response: Sediments within Leaburg Lake would likely be derived from a number of sources, including the mainstem McKenzie and Blue River, as well as, the South Fork (Cougar Reservoir). All of the forested areas in the area had DDT applied between 1949 and 1953 for budworm control (ref. U.S. Forest Service Map 31). We felt collecting suspended sediment during storm events would better represent what might be migrating out of Cougar Reservoir.

Comment: Appendix B. Please provide method detection levels of the 1996 sediment sample analysis.

Response: Total DDT was detected at 0.0025 mg/kg. Comment: Evaluate and report on the correlation between DDT and TOC levels detected in the August sampling.

Response: The data indicate a correlation between total DDT and TOC. This is not too surprising, as the forest was treated with DDT between 1949 and 1953 (U.S. Forest Service Map 31). It appears that this same organic material, that was treated with DDT and became part of the forest floor duff, is still present in organic layers within the reservoir. Total DDT is hydrophobic and binds with both

fine-grained sediment and organic material. Comment: Are there any indications that the recent slides related to the Rush Creek diversion failure occurred in areas tested for DDT? Response:

There was a composite sample collected from bottom sediments several hundred feet out from the outfall prior to the diversion failure, which contained 1.08 ug/kg total DDT. Comment: Has

the Corps considered conducting settling tests on turbid water released from the dam to collect additional material for DDT analysis? Response: The USGS under contract to the Corps has

collected turbid water from two storm events (1st event the end of January and first of February, and 2nd event in March). These samples were filtered and no total DDT was detected at 0.0005 ug/kg in the water and 0.002 ug/kg on filtrate. Additional storm event collections are planned.

McKenzie River Guides Association comments, provided by William D. Carpenter, Jr., attorney at law: Comment: The Corps has violated NEPA by relying on a fundamentally misleading

economic analysis. Comment: The Corps has erred in relying on incomplete data to conclude that economic losses from the recreational sector is not significant. Comment: The Corps has

erred in determining the “context” of significance by distributing impacts countywide instead of locally. Comment: These errors warrant further evaluation and consideration under NEPA.

Response: The Corps does not believe that the economic data are fundamentally misleading.

The Federal government uses standard metropolitan statistical areas and counties as the lowest-level of measures of Federally-significant events. This is the standard starting point for any Federal economic analysis. In addition, the local communities supplied additional local data which have been incorporated into the final report. Thus, the final report has both standard county Federal data and locally supplied local economic data. Similarly, the standard for what is economically significant to a Federal program is greater than the commenters would like. The reason is that the Federal Government is generally national in scope, and under the Constitution, local issues are usually left to the states and subordinate state political bodies. The Federal focus, per the Constitution, is on inter-state commerce, not intra-state commerce.

The report acknowledges local financial losses and illustrations are included in the final SIR, Section 8.7. In addition, pending agency legislation, WRDA 2003, includes provisions for economic relief for those relatively few businesses and individuals who were severely impacted by the temporary turbidity problems.

Comment: All economic information presented in last year’s letter from the Guides remains

accurate and valid. Response: Some illustrations of claimed losses from the June 7, 2002, letter are included in the final SIR, Section 8.7.

Kari Westlund, CEO for CVALCO: Comment: CVALCO's limited survey results should not be misrepresented. The SIR should be revised to clarify this issue. Response: The final SIR reflects this issue.

Donald Rodriguez, resident, provided comments via e-mail: Comment: Has release of clay-silt altered the McKenzie River ecosystem forever? Response: There are no data to indicate that clay-silt has adversely affected the McKenzie River ecosystem. A return to more normal river temperatures is expected to have a long-term, beneficial affect on the ecosystem. That is the purpose of the project. Comment: Why the unusual bright green algae/moss? Why wasn't this addressed in the SIR? Response: Oregon State Fisheries biologist anecdotal observations suggest that plant growth has varied in some years even before this new construction at Cougar began. However, a sudden change in species composition and growth for a period of years would indicate a potential problem.

Assuming there was excess plant growth in the McKenzie River in summer of 2002 and that it was related to water coming from Cougar Reservoir, there could be several possibilities. For instance, excess turbidity could reduce light penetration to the river bottom which in turn could allow plant species with different light requirements an advantage over other plant species. Or, transport of sediment from Cougar Reservoir could have resulted in increased nutrients in the river water which in turn could stimulate excess plant growth on the river bottom. Phosphorus is known to attach to fine-grained sediment and it could stimulate plant growth. We have no data to suggest that phosphorus levels were higher in 2002 versus other years. Organic carbon associated with sediment particle could also serve as a nutrient. The temperature of river water could also impact plant growth - warmer water stimulates growth. But, a comparison of mean daily water temperatures at Vida for 2001 and 2002 during the period April through November, shows very little difference except, perhaps in July. The effect was slight. In July 2002 mean daily temperatures averaged 0.8 degrees C higher than in 2001. Even so, from April through June and from August through mid September water temperatures at Vida were warmer in 2001 than 2002. In short, if there was increased plant growth, a combination of decreased light, increased turbidity, possibly increased nutrients such as phosphorus and organic carbon, and different water temperatures may have increased plant growth in the mainstem McKenzie. Or, the increased plant growth may have been a normal between years variation. Once reservoir construction is over conditions should return to as before except for one environmental variable - temperature. Temperature in the South Fork is expected to return to pre-dam conditions.

A point that needs to be emphasized is that for the past 39 years, since the dam was built, the South Fork and the mainstem McKenzie Rivers, probably as far as Vida, have not been "natural" in terms of historic conditions that fish and humans residents experienced. In other words, the river as now experienced, is not the normal, natural, pristine river. The purpose of the construction project is to return the South Fork and mainstem to more natural conditions. The aquatic organisms that now inhabit the rivers are adapted to current conditions. We can expect changes in aquatic communities that reflect the restored natural conditions. A discussion of aquatic vegetation growth has been added to the final SIR.

Comment: Is there a link between the turbidity and the viral deaths in Leaburg Hatchery?

Response: No. There is no direct relationship between levels of turbidity or suspended sediment in the water column and the infection rate of fishes with disease. That is, fine sediment particles suspended in water are not typically vectors of fish diseases. However, suspended sediment can stress fishes. Stressed fishes are more susceptible to infection. Oregon Department of Fish and

Wildlife indicated that the presence of hatchery summer steelhead in the mainstem McKenzie River above Leaburg Dam was the likely source of infection for disease outbreaks occurring in rainbow trout held at Leaburg Hatchery. However, turbidity in the hatchery water supply may have contributed at an unknown level to this problem through stressing of the hatchery fish.

Comment: Was there a massive fish kill within Cougar Dam during the initial drawdown?

Response: No. No dead fish were found except for a few fish that were stranded in specific locations during reservoir drawdown.

12. I have determined that the proposed action would have no significant impact on the environment and that an environmental impact statement is not required. With this action I am amending the environmental assessment for the Cougar Lake Intake Structure Modifications, Lane County, Oregon.

31 JUL 2003

Date _____



RICHARD W. HOBERNIGHT
Colonel, EN
Commanding

References Cited

- Convention and Visitors Association of Lane County. 2002. News Release, June 21 and June 28, 2002. Eugene, Oregon.
- Eugene Water and Electric Board. Eugene, Oregon. 2001, 2002, 2003. Personal Communications with Corps Personnel.
- EPA. May 1986. Quality Criteria for Water. EPA 440/5-86-001.
- O'Brien, Patrick S., Dr. Terry M. Sobeck and John Hains. 2003. Developing Reservoir Operational Plans to Manage Erosion and Sedimentation during Construction, Willamette Temperature Control - Cougar Reservoir 2002 – 2003. IN "Proceedings of the Watershed System 2003 Conference, May 2003, Portland, Oreg. US Army Corps of Engineers, Davis, Calif. (Due out as CD, August 2003)
- Oregon Department of Fish and Wildlife. Personal communication between ODFW staff and Corps personnel during 2001-2003. Also ODFW Quarterly Reports.
- Stahlberg, Mike. 2002. The water's fine. McKenzie salmon and steelhead fishing is productive as river begins to clear. The Register-Guard. Eugene, Oreg. June 6, 2002.
- Stewart, G., J.R. Glassmann, G.E. Grant, S. Lewis, and J. Ninneman. 2002. Evaluation of fine sediment intrusion into salmon spawning gravels as related to Cougar Reservoir sediment releases. Prepared by USDA Forest Service, Pacific Northwest Research Station and Department of Geosciences, Oregon State University, for U.S. Army Corps of Engineers, Portland District, Portland.
- The Register-Guard. 2003. Briefly: Outdoor Outlook. April 3, 2003. Eugene, Oreg.
- Wisseman, R. 1996. Benthic invertebrate biomonitoring and bioassessment in western montane streams. Aquatic Biology Associates, Inc., Corvallis, Oregon.